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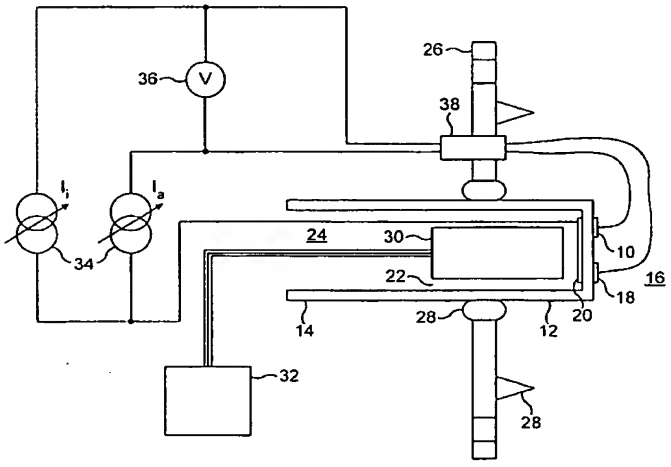
(54) Title: ELECTROCHEMICAL SENSOR



(57) Abstract: An organic contaminant molecule sensor is described for use in a low oxygen concentration monitored environment. The sensor comprises an electrochemical call comprising a solid state oxygen anion conductor (14) in which oxygen anion conduction occurs at or above a critical temperature T_c, an active measurement electrode (10) formed on a first surface (12) of the conductor for exposure to the monitored environment, the measurement electrode comprising material for catalysing the oxidation of an organic contaminant molecule to carbon dioxide and water, an inert measurement electrode (18), formed on the first surface (12) of the conductor adjacent to and independent from the active measurement electrode, for exposure to the monitored environment, the inert measurement electrode comprising material that is catalytically inert to the oxidation of an organic contaminant molecule, and a reference electrode (20) formed on a second surface (22) of the conductor for exposure to a reference environment, the reference electrode comprising material for catalysing the dissociative adsorption of oxygen. Means (30, 32) are provided for controlling and monitoring the temperature of the cell. Means (34) are also provided for controlling the electrical current I_a flowing between the reference electrode and the active measurement electrode and the electrical current I_i flowing between the reference electrode and the inert measurement electrode, thereby to control the flux of oxygen anions flowing between the reference electrode and the active and inert measurement electrodes respectively. The potential difference between the active measurement electrode and the inert electrode is monitored (36), whereby in the absence of organic contaminant molecules the potential difference V_{sense} between the active and inert measurement electrodes assumes a base value V_b and in the presence of organic contaminant molecules the potential difference V_{sense} between the active and inert measurement electrodes assumes a measurement value V_m, the value $V_m - V_b$ being indicative of the concentration of organic contaminant molecules present in the monitored environment.

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